Kennedy Space Center's
SPACEPORT
MAGAZINE
January 2015 Vol. 2 No. 1
ULA
2014
YEAR IN PHOTOS
National Aeronautics and
Space Administration
NASA

KENNEDY SPACE CENTER'S

SPACEPORT MAGAZINE

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APRIL 2014

MAY 2014

JUNE 2014

JULY 2014

AUGUST 2014

SEPTEMBER 2014

OCTOBER 2014

NOVEMBER 2014

DECEMBER 2014

Cover: A Delta IV Heavy rocket lifts off from Space Launch Complex 37 at Cape Canaveral Air Force Station in Florida carrying NASA's Orion spacecraft on an unpiloted flight test to Earth orbit. Liftoff was at 7:05 a.m. EST. During the two-orbit, four-and-a-half hour mission, engineers evaluated the systems critical to crew safety, the launch abort system, the heat shield and the parachute system. For more information, visit www.nasa.gov/orion
Photo credit: NASA

Back Cover: Expedition 42 crew members take a break from training to pose for a fun crew portrait. Pictured are NASA astronaut Terry Virts, Russian cosmonaut Anton Shkaplerov, Russian cosmonaut Alexander Samoukutyaev, all flight engineers; NASA astronaut Barry Wilmore, commander; flight engineers Russian cosmonaut Elena Serova and European Space Agency astronaut Samantha Cristoforetti.
Image credit: NASA

NASA'S LAUNCH SCHEDULE

Date: Jan. 6 -- 6:18 a.m. EST
Mission: Fifth SpaceX Commercial Resupply Services Flight with Cloud-Aerosol Transport System (SpaceX CRS-5)
Description: Launching from Cape Canaveral Air Force Station, Florida. SpaceX CRS-5 will deliver cargo and crew supplies to the International Space Station. It will also carry CATS, a laser instrument to measure clouds and the location and distribution of pollution, dust, smoke, and other particulates in the atmosphere.

Targeted Date: Jan. 29
Mission: Soil Moisture Active Passive (SMAP)
Description: SMAP is an Earth satellite mission designed to measure and map Earth's soil moisture and freeze/thaw state to better understand terrestrial water, carbon and energy cycles. It will launch on a Delta II 7320 from Complex 2 at Vandenberg Air Force Base, Calif.

No Earlier Than: February
Mission: Sixth SpaceX Commercial Resupply Services Flight (SpaceX CRS-6)
Description: Launching on a Falcon 9 from Cape Canaveral Air Force Station, SpaceX CRS-6 will deliver cargo and crew supplies to the International Space Station.

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I am
KENNEDY
SPACE CENTER

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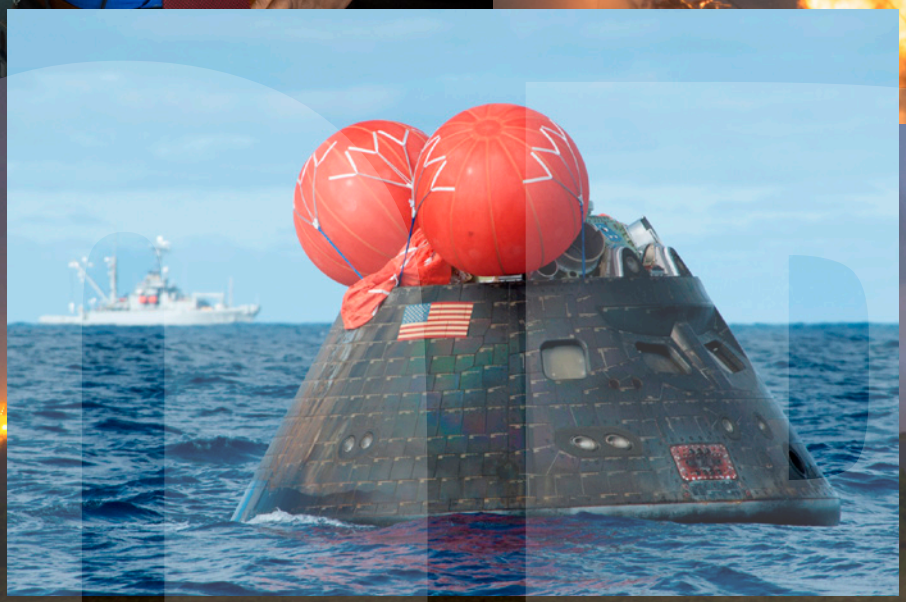
Ashley Stockbridge

I am a Telecommunications Engineer for NASA in the IT Voice and Imagery Branch. My career in the space industry began as a five-semester co-op systems engineer for United Space Alliance where I worked in the space shuttle orbiter communications group. My duties entailed testing and troubleshooting the shuttle communications systems.

After earning a bachelor's in electrical engineering at Mississippi State University (Hail State!), I worked 2.5 years for the Department of Defense specializing in electro-optics/ infrared systems testing, but I longed to return to Kennedy Space Center. Last year, I was able to return and now I oversee Kennedy's Land Mobile Radio (LMR) and voice recording systems while also training to become Kennedy's alternate RF spectrum manager.

As we, at Kennedy, endeavor to address the need of new customers while retaining our existing customers with LMR solutions, our legacy radio system needs to be upgraded and replaced. This is a common challenge across NASA Centers. This challenge has led to an expansion of my duties to extend beyond Kennedy. I now am the LMR service element manager for the agency. In this role, my responsibility will be to work with the other NASA Centers to find solutions that will lead to every center meeting their LMR needs.



ORI

NEARLY FLA

Orion passes Exploration Flight Test-1 with flying colors

By Steve Siceloff

A spacecraft built for humans left the domain of low-Earth orbit Dec. 5 for the first time in 42 years when NASA's first Orion soared 3,604 miles above Earth and returned safely hours later, having accomplished a flawless flight test as part of NASA's journey to Mars.

"We as a species are meant to press humanity further into the solar system and this is a first step," said Bill Gerstenmaier, NASA's associate administrator for the Human Exploration and Operations Directorate. "What a tremendous team effort."

It was just the kind of mission NASA hoped for, all the while knowing that the first mission by any spacecraft often turns up significant glitches. That was not the case this time though. The cone-shaped Orion held up to all the pressures of launch and ascent into orbit, then made two passes through the high radiation of the Van Allen belts before facing the searing plunge into Earth's atmosphere and splashing down under three billowing parachutes.

Watching the spacecraft descend through the sky over the Pacific Ocean in real time via an unmanned aircraft system dispatched from NASA's Armstrong Flight Research Center in California, Orion managers and NASA's senior leadership seemed to hold their breath until the first drogue parachutes deployed from the nose of Orion. Gasps turned quickly to applause and hugs moments later when the huge main parachutes opened to slow the capsule to a gentle 20 mph splashdown 270 miles west of Baja California.

"It is hard to have a better day than today," said Mark Geyer, Orion program manager.

Just four-and-a-half hours earlier, Orion sat on the other coast of the country, atop a Delta IV Heavy rocket waiting to launch from Cape Canaveral Air Force Station in Florida. The liftoff had already been delayed by a day because of high winds and then balky fill-and-drain valves. Neither problem showed itself Friday, though, and the three engines of the United Launch Alliance rocket ignited on time at 7:05 a.m. EST to begin a brilliant climb into space. With the core boosters separated, the second stage lifted Orion into its initial orbit and the launch abort system tower and service module support fairings jettisoned as planned, two important system tests for the new spaceship.

The harsher aspects of the flight came later when the second stage re-ignited to send Orion 3,604 miles above Earth, an altitude 15 times higher than the International Space Station. The spacecraft flew through the high radiation in the Van Allen belts on the way out and then on the way back but its systems held up fine. The spacecraft sent back video shot through its two windows of what Earth looks like from that height.

"The upper stage put us right where we wanted to be and some of those pictures where you could see the frame of the window, you don't feel like you're watching like a satellite, you feel like an astronaut yourself," Geyer said.

"That picture really meant something to me," said astronaut Rex Walheim, a mission specialist who flew on the final space shuttle mission and is now helping develop this new generation of human spacecraft.

The fiery plunge through the atmosphere came next, with Orion slamming into the thickening air at 20,000 mph, fast enough to produce a 4,000 degree F plasma field around the spacecraft.

AWLESS

The test was made strenuous on purpose: spacecraft coming back from lunar orbit are travelling faster than those returning from low Earth orbit, so engineers wanted to test the Orion armor in as realistic a circumstance as they could.

That was the same approach to designing the whole mission, Geyer said.

"We had the models and we have the best people on the planet, but until you fly it, you don't know," Geyer said.

Orion touched down about a mile away from the landing spot controllers predicted before launch, achieving a statistical bulls-eye splashdown for something returning to Earth from 3,600 miles away.

Engineers will evaluate all the data recorded on the ground and on the spacecraft's onboard systems including readings from 1,200 sensors placed throughout the crew module to find out more details about all the elements of the spacecraft and the details of their performance.

"The first look looks really good from a data standpoint," Gerstenmaier said, comparing watching the well-executed flight to an artist pondering a masterwork.

Orion did not carry any people into space during this flight, but is designed to take astronauts on deep space missions in the future. It became the first spacecraft designed for humans to leave low-Earth orbit since the Apollo 17 mission, the last moon landing by NASA.

"We're already working on the next capsule," said Mike Hawes, Lockheed Martin's Orion program manager, the company that built Orion and operated the flight for NASA. "We'll learn a tremendous amount from what we did today."

The next spacecraft is being built to fly Exploration Mission-1, or EM-1. It will also fly without astronauts onboard, but will make a much longer flight, this time going around the moon carrying an operational service module to produce power and topping off the first test of the gigantic Space Launch System rocket now under development. Although the Delta IV could get Orion into high Earth orbit, the spacecraft will require the power of the SLS to push it out into deep space.

"I don't think you could find an astronaut who wouldn't be excited to fly Orion," Walheim said, "This is true exploration."

The Orion crew module is recovered after splashdown in the Pacific Ocean about 600 miles off the coast of San Diego, California on Dec. 5.

NASA, the U.S. Navy and Lockheed Martin coordinated efforts to recover Orion and secure the spacecraft inside the well deck of the USS Anchorage.

After lifting off at 7:05 a.m. EST atop a Delta IV Heavy rocket from Space Launch Complex 37 at Cape Canaveral Air Force Station in Florida, NASA's Orion spacecraft completed a two-orbit, four-and-a-half hour mission to test systems critical to crew safety, including the launch abort system, the heat shield and the parachute system.

The Ground Systems Development and Operations Program led the recovery efforts.

For the complete story, visit: http://go.nasa.gov/13rVMXn

Photo courtesy of U.S. Navy

NASA
M. HOPKINS
M. HOPKINS

In January, NASA and President Obama's Administration agreed to extend operation of the International Space Station until at least 2024.

First, it will allow NASA to complete necessary research activities aboard the station in support of planned long-duration human missions beyond low-Earth orbit -- including our planned human mission to an asteroid by 2025 and to Mars in the 2030s.

Second, it will extend the broader flow of societal benefits from research on the station.

For more information, visit:
http://www.nasa.gov/mission_pages/station/main/index.html

Photo credit: NASA

John Hennessey, founder of Hennessey Performance and maker of the Hennessey Venom GT, brought his high-performance production sports car to the 3.5-mile-long Shuttle Landing Facility at Kennedy Space Center in January to evaluate its aerodynamics and see how the car would handle throughout its performance range.

The runway is one of only about a half dozen places in the world that has the kind of room and infrastructure to make test runs safely.

To watch a video of the test, go to: http://go.nasa.gov/1zYHgmX

Photo credit: NASA/Kim Shiflett

The Ground Systems Development and Operations Program completed testing of the new traction roller bearings on crawler-transporter 2 (CT-2) on two of the massive vehicle's truck sections, A and C, in late January.

Upgrades to CT-2 are necessary in order to increase the lifted-load capacity from 12 million to 18 million pounds to support the weight of the Mobile Launcher and future launch vehicles, including the Space Launch System and Orion.

For more information, visit: http://go.nasa.gov/1qfWy1s

Photo credit: NASA

4A4

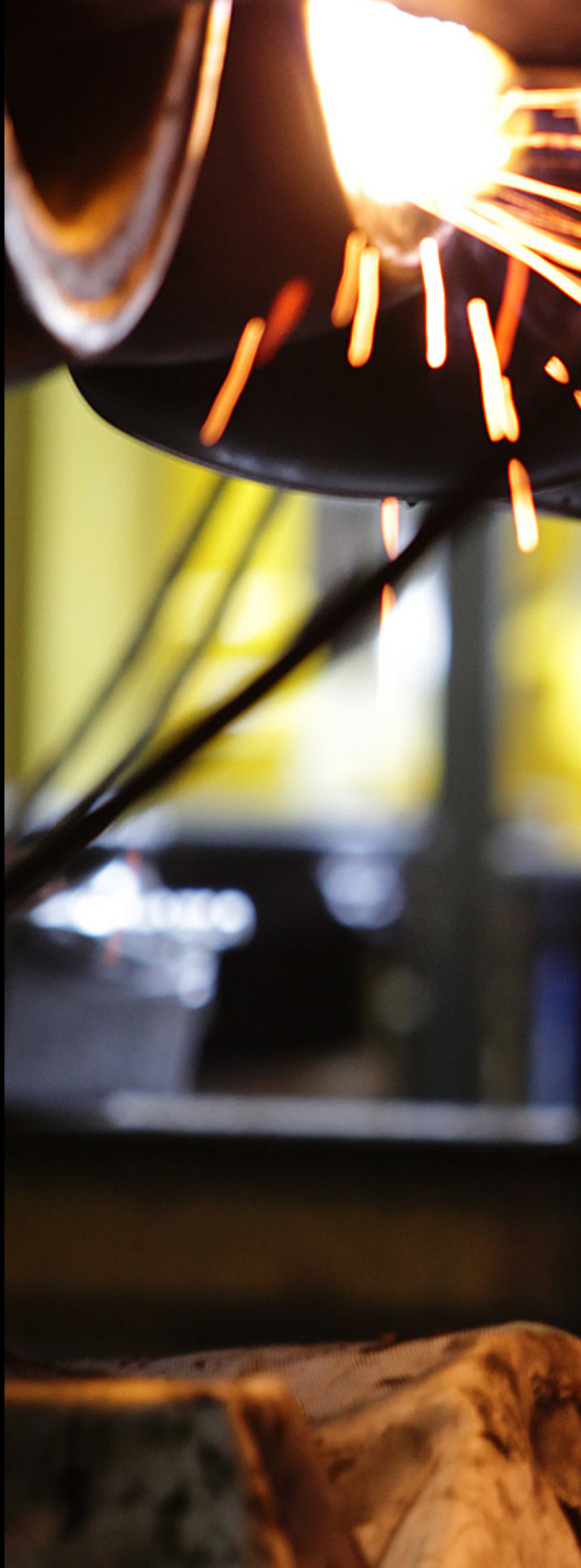
A ground support technician applies heat to a casing of crawler-transporter 2 (CT-2) inside the Vehicle Assembly Building on March 11.

New roller bearing assemblies have been installed on CT-2. The modifications are designed to ensure the crawler's ability to transport launch vehicles currently in development, such as the agency's Space Launch System, to the launch pad.

The Ground Systems Development and Operations Program office at Kennedy is overseeing the upgrades.

For more information on Ground Systems Development and Operations, visit: http://go.nasa.gov/1zZ7mpJ

Photo credit: NASA/Kim Shiflett



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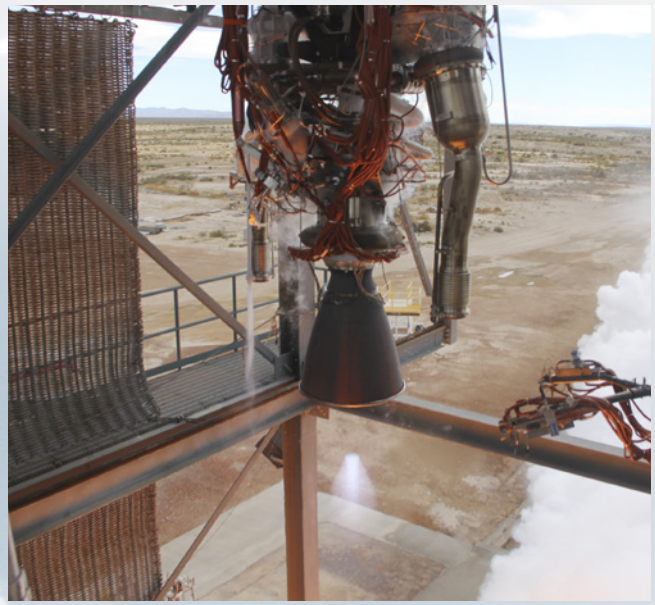


CABANA
HALSELL WALZ
STURCKOW

Six-year-old Connor Johnson and his family, from Denver, learned of potential budget cuts last year that threatened his dream of working for NASA so he decided to start a petition on the White House website.

And it's that forward thinking that allowed Connor and his family to be invited as guests of the Kennedy Space Center Visitor Complex.

Connor proudly gave Kennedy Center Director Bob Cabana $9 to help fund NASA. "Every penny helps," a delighted Cabana said.

For more information, visit: http://go.nasa.gov/1GpBrkq

Photo credit: NASA/Dan Casper

Ecologist Carlton Hall is on a different kind of mission at Kennedy Space Center -- one to take care of and protect the center's land and resources for current and future generations.

To recognize his efforts in climate change research related to Kennedy's future launch capabilities, Hall, with InoMedic Health Applications Inc., received the KSC Scientist of the Year Award during the 2014 NASA Kennedy Space Center Honor Awards ceremony.

For more information, visit: http://go.nasa.gov/1BMP0Yx

Photo credit: NASA/Dan Casper

Found only in the Sunshine State, the intelligent, social Florida scrub jay serves as an environmental indicator of the health of the state's scrub habitats. Ecologists at Kennedy Space Center are supporting adaptive resource-management science to help save the species.

The Florida scrub jay (Aphelocoma coerulescens) is endemic to the region; you won't find one anywhere else in the world.

For more information, visit: http://go.nasa.gov/1zZoaNp

Photo credit: NASA/Dan Casper

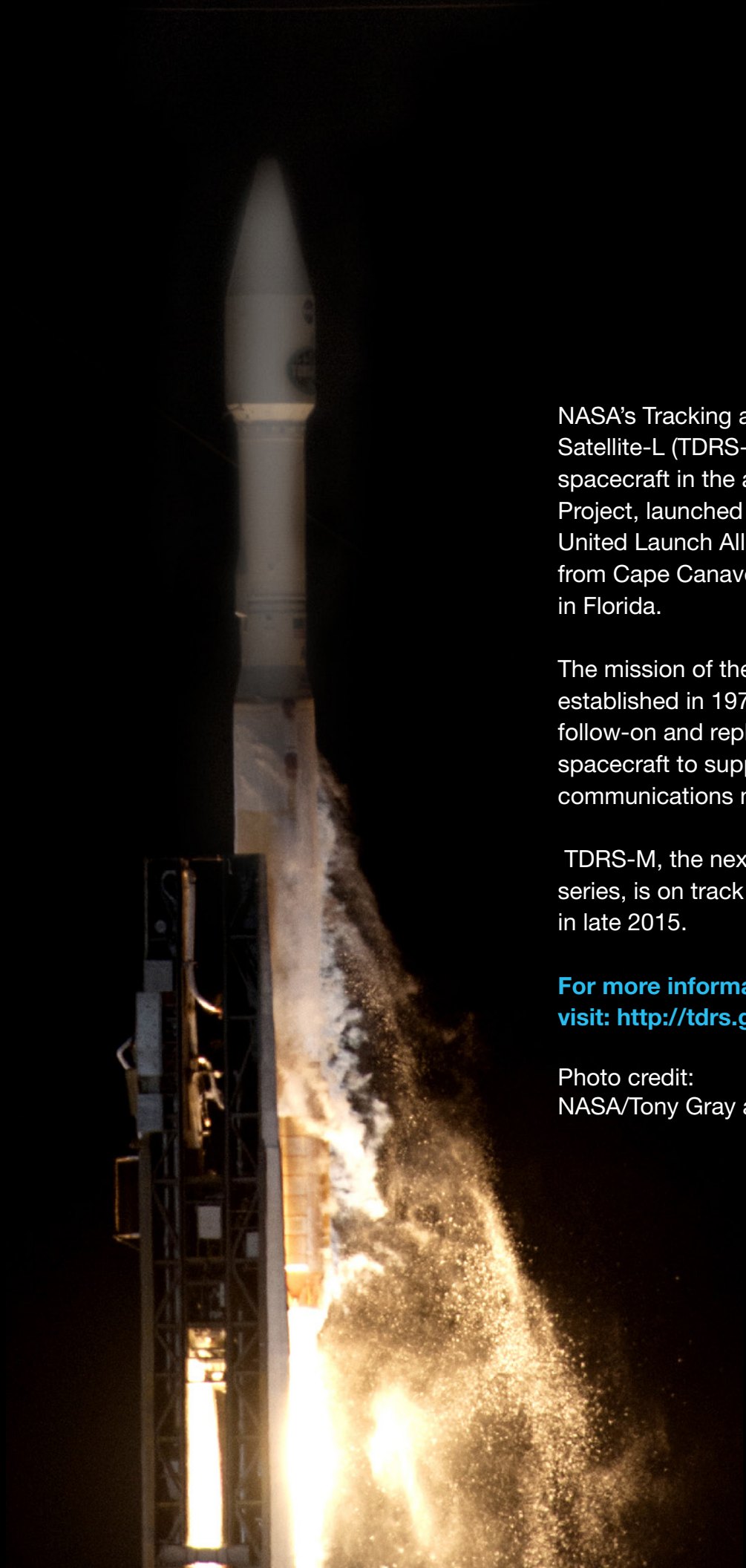
Fog envelopes the top of the 405-foot-tall Mobile Launcher that towers above its construction site in the heart of Launch Complex 39 at Kennedy Space Center on Feb. 7.

The mobile launcher will support NASA's next heavy-lift launch vehicle, the powerful Space Launch System. It is being bulked up in preparation for the forces of liftoff.

Modifications of the ML expanded the exhaust opening from about 22 by 22 feet to about 64 by 32 feet

For more information, visit: http://go.nasa.gov/1qg13Jf

Photo credit: NASA/Ben Smegelsky



NASA's Tracking and Data Relay Satellite-L (TDRS-L), the 12th spacecraft in the agency's TDRS Project, launched Jan. 23 aboard a United Launch Alliance Atlas V rocket from Cape Canaveral Air Force Station in Florida.

The mission of the TDRS Project, established in 1973, is to provide follow-on and replacement spacecraft to support NASA's space communications network.

TDRS-M, the next spacecraft in this series, is on track to be ready for launch in late 2015.

For more information about TDRS, visit: http://tdrs.gsfc.nasa.gov

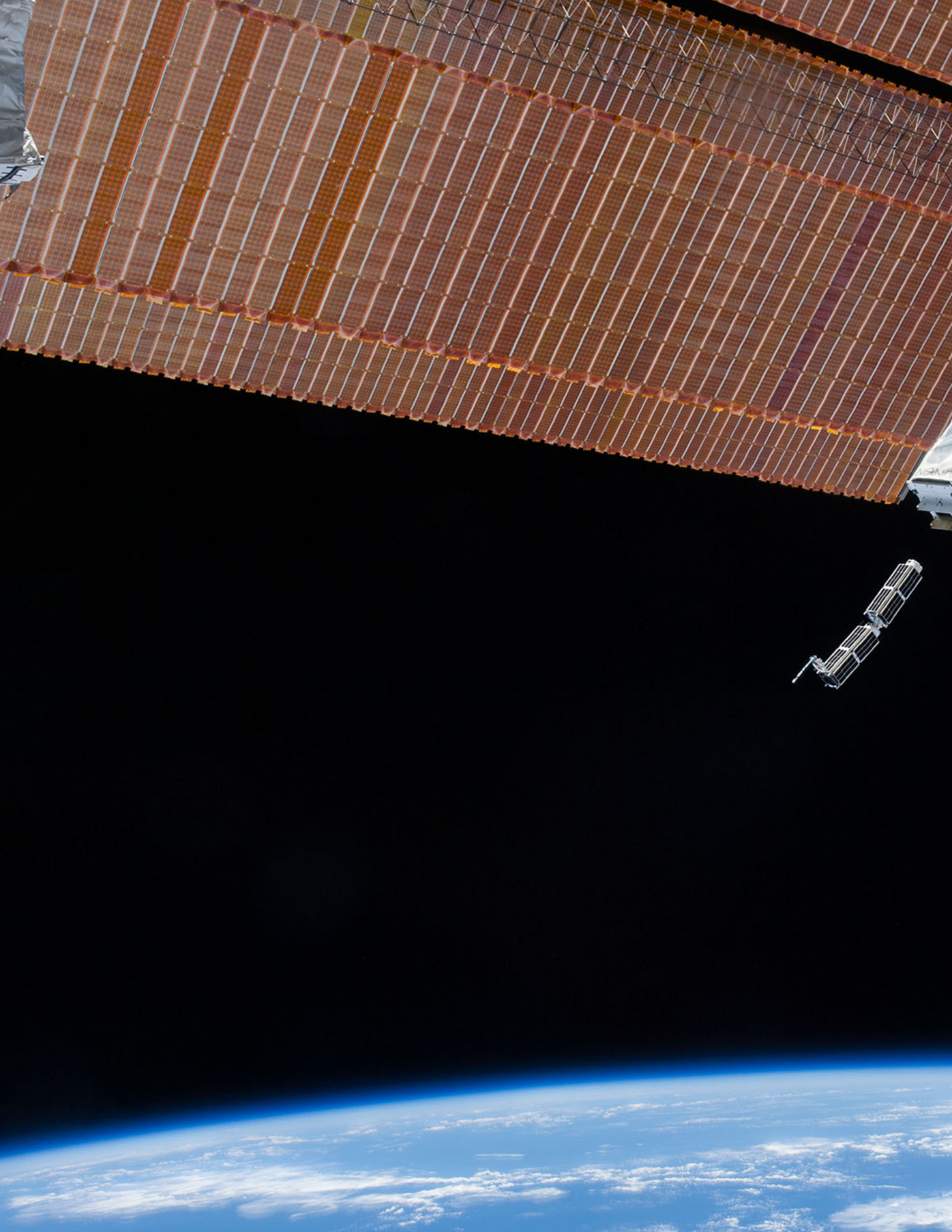
Photo credit:
NASA/Tony Gray and Sandy Joseph

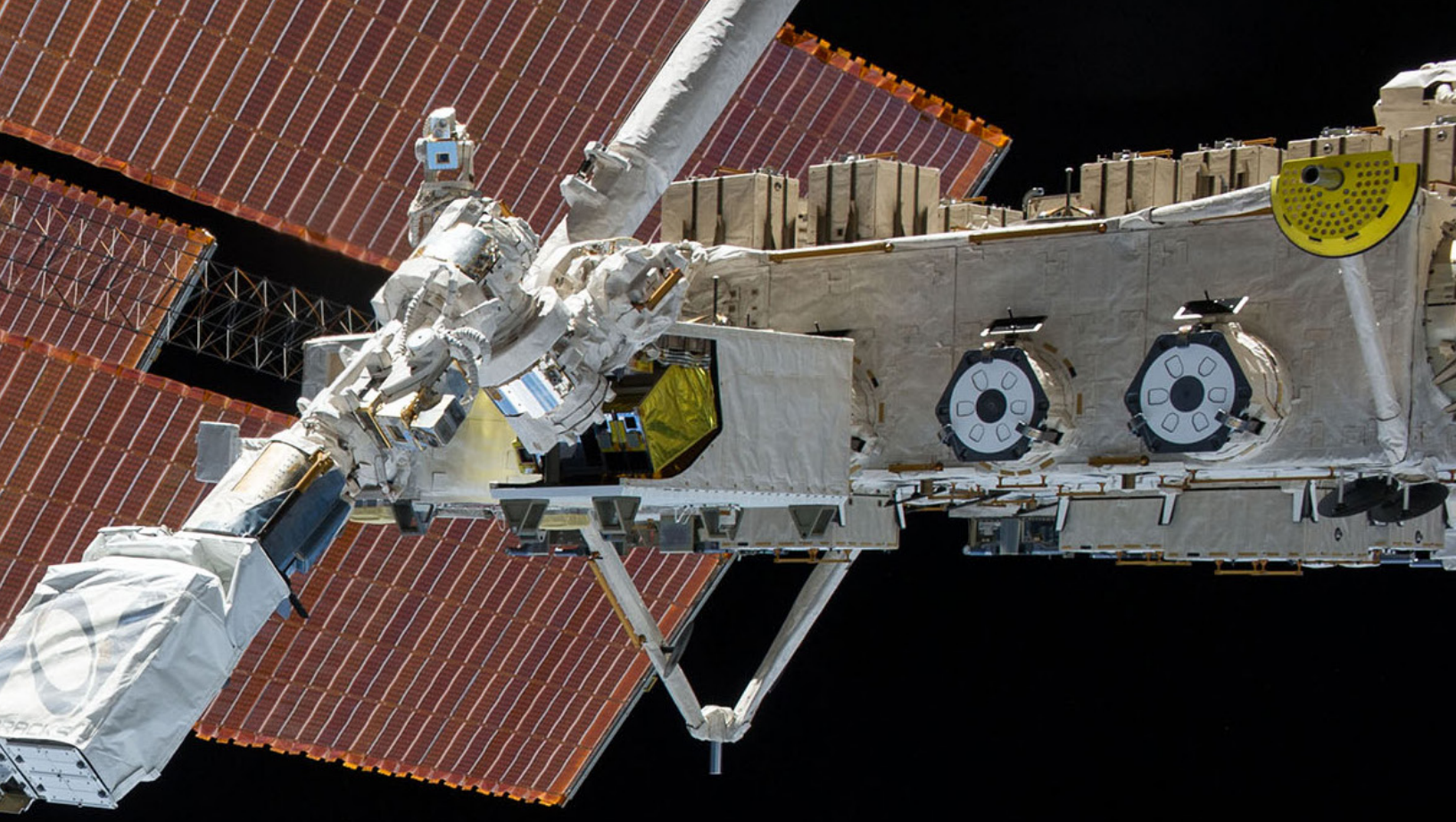
MCCONKEY

Special Rescue Operations firefighters with NASA Fire Rescue Services in the Protective Services Office at Kennedy Space Center participated in a training exercise at the Shuttle Landing Facility on March 6.

Firefighters, wearing protective gear, use hoses to put out a fire burning on a mock-up of a small plane. Kennedy's firefighters achieved Pro Board Certification in aerial fire truck operations and also completed vehicle extrication training using the Jaws of Life.

Photo credit: NASA/Kim Shiflett





A set of Nano CubeSats were deployed by the Expedition 38 crew onboard the International Space Station on Feb. 11.

More than 120 students were involved in the design, development and construction of the CubeSats that were flown as auxiliary payloads on the SpaceX CRS-3 cargo resupply mission to the ISS.

The CubeSat program contains a variety of experiments such as Earth observations and advanced electronics testing.

For more information, visit: http://go.nasa.gov/nXOuPI

Photo credit: NASA

A SpaceX Dragon spacecraft full of cargo, experiments and equipment arrived at the International Space Station where it was grappled by the Canadarm2 and locked into place so astronauts could retrieve almost 5,000 pounds of equipment, experiments and supplies April 20.

The manifest for the flight included a spacewalking suit for astronauts plus related hardware and supplies for more than 150 science investigations to be conducted by the space station crews.

For more information, visit: http://go.nasa.gov/1BVzZGE

Photo credit: NASA

The historic site where American astronauts first launched to the moon was the location of a recent landmark agreement, part of NASA's continuing process to transform the Kennedy Space Center into a 21st century spaceport.

During ceremonies April 14, agency officials announced they signed a property agreement with SpaceX of Hawthorne, Calif., for use and operation of Launch Complex 39A for the next 20 years.

For more information, visit: http://go.nasa.gov/1ztLjGy

Photo credit: NASA/Dan Casper

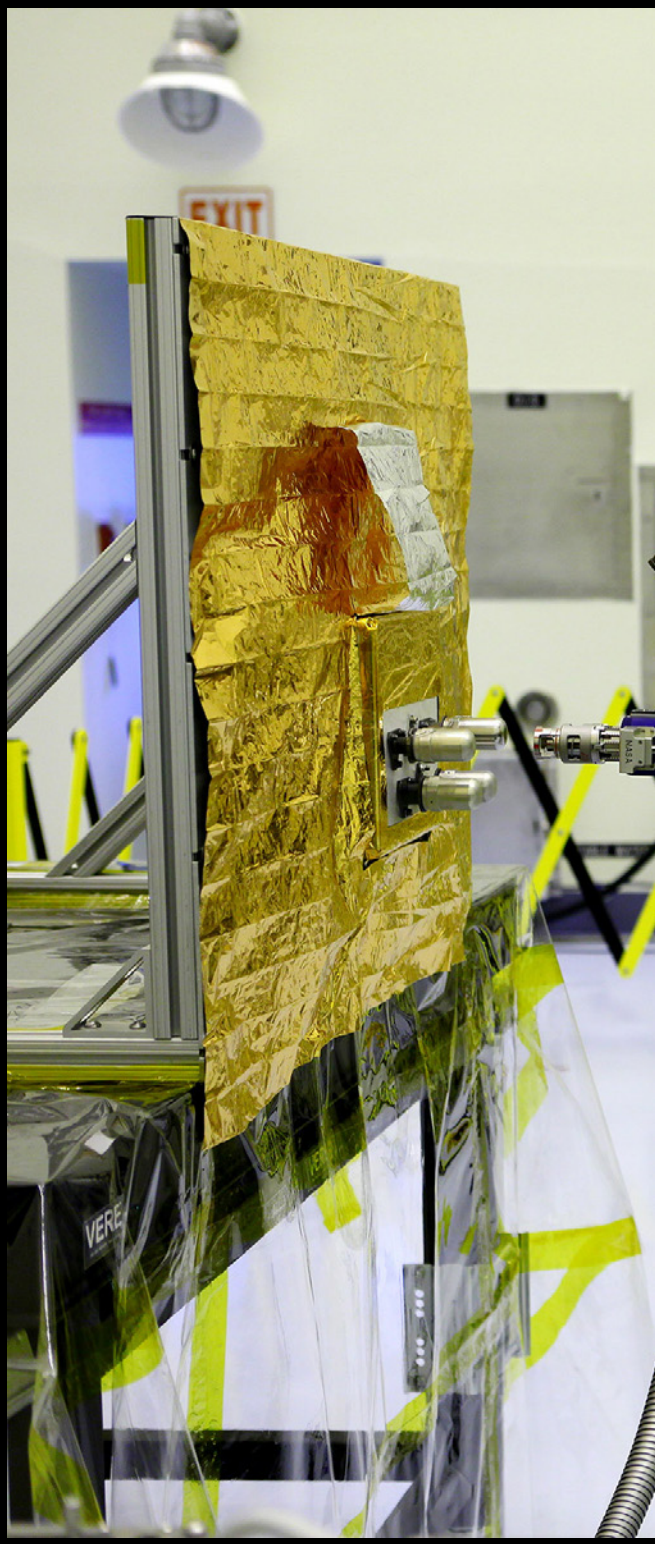
From weather observations to navigation to communications, Earth-orbiting spacecraft are now so prevalent they could easily be taken for granted.

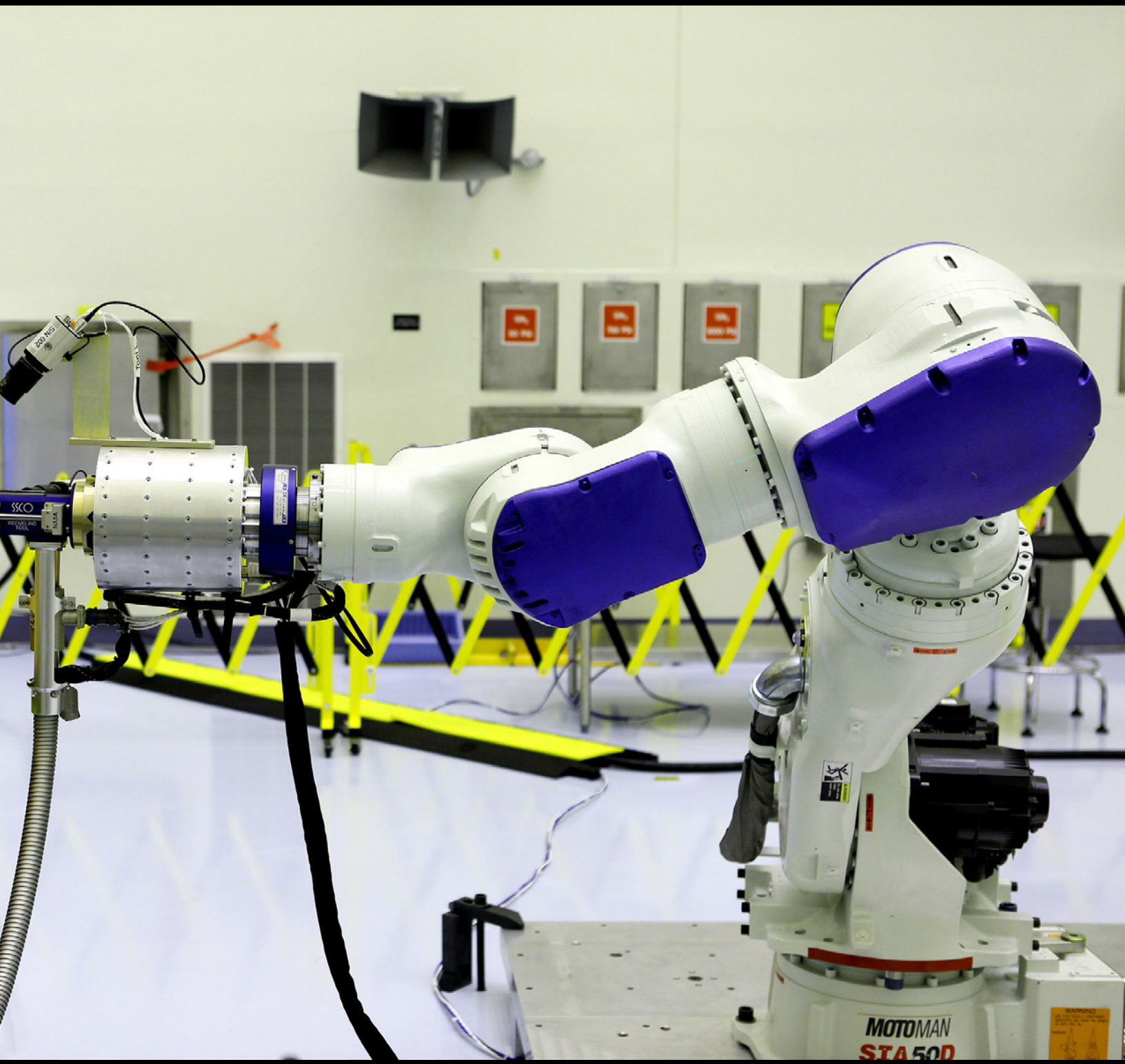
A team at Kennedy Space Center, collaborating with counterparts at the agency's Goddard Space Flight Center in Greenbelt, Maryland, demonstrated ground breaking technology that could add additional years of service to satellites.

Engineers are performing the design, development and qualification testing of the critical hypergolic propellant transfer system for a simulated servicing satellite.

For more information, visit: http://go.nasa.gov/1uQ2VHF

Photo credit: NASA




MOTOMAN
SIA50D

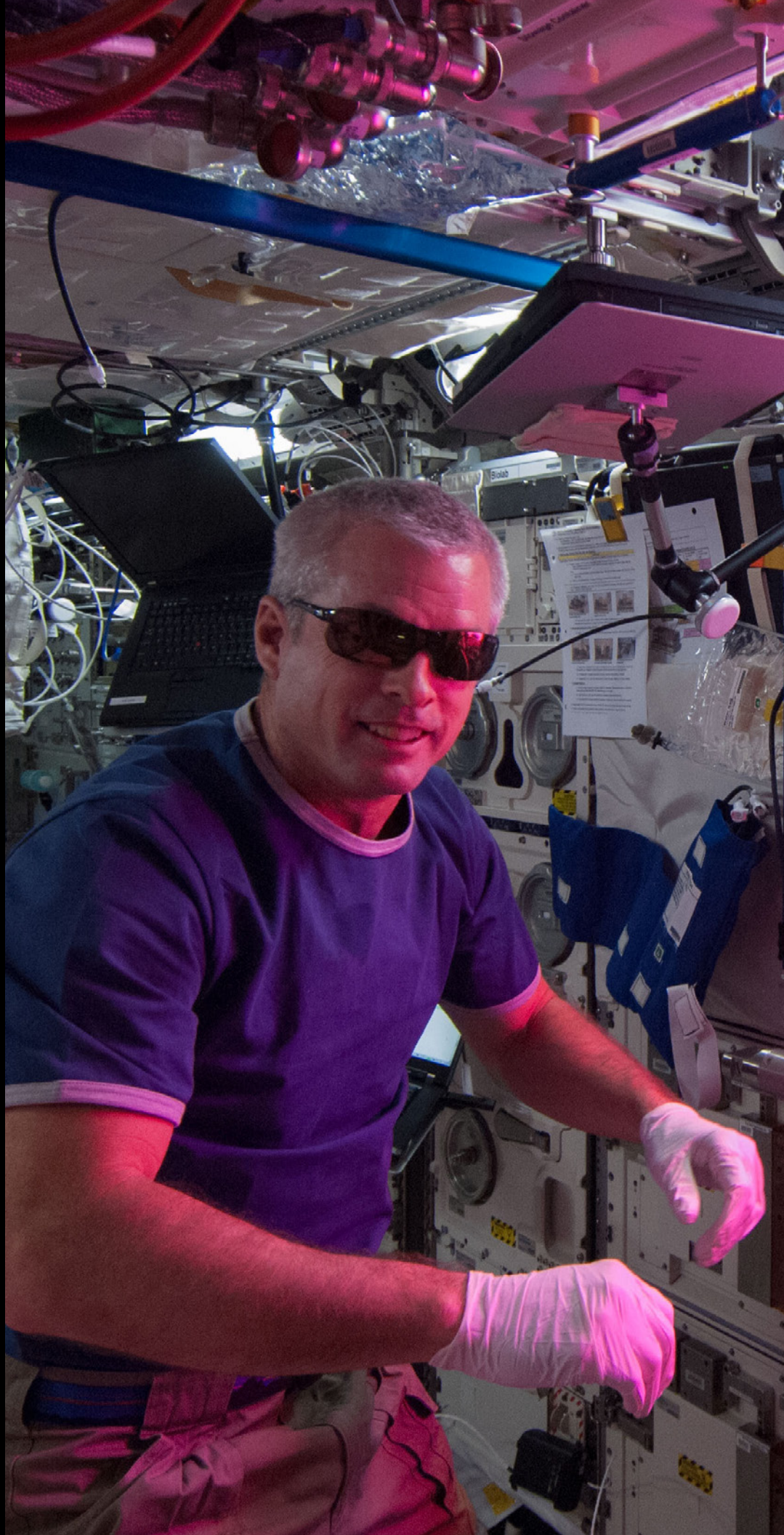
The American alligator (Alligator mississippiensis) is a longtime resident at Kennedy Space Center, which shares boundaries with the Merritt Island National Wildlife Refuge on Florida's east coast.

This is a unique population that spends a large amount of time in an estuarine environment.

Although they typically choose to stay in or near the water, they're often spotted crossing roads, sunning themselves on runways, venturing into parking lots or wandering a little too close to buildings.

For more information, visit: http://go.nasa.gov/1wDCvhm

Photo credit: NASA/Dan Casper



Wearing sunglasses, NASA astronaut Steve Swanson activates the Veggie plant growth system and Veg-01 experiment May 8 in the Columbus module on the International Space Station.

A root mat and six plant “pillows,” each containing ‘Outredgeous’ red romaine lettuce seeds, were inserted into the chamber. The pillows received about 100 milliliters of water each to initiate plant growth.

Inside each plant pillow is a growth media that includes controlled release fertilizer and a type of clay used on baseball fields.

For more information, visit: http://go.nasa.gov/1wDMcMW

Photo credit: NASA

NASA
EXPRESS 3
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(EMCS)
EADS

A SpaceX Dragon spacecraft full of NASA cargo, experiments and equipment blazed into orbit April 18, aboard the company's Falcon 9 rocket.

The astronauts aboard the International Space Station unloaded the supplies after the Dragon arrived.

The manifest for the Dragon included almost 5,000 pounds of material including a spacewalking suit for astronauts plus related hardware and supplies for more than 150 science investigations to be conducted by the space station crews.

For more information, visit: http://go.nasa.gov/1BVzZGE

Photo credit: NASA

Team “Astrobotics,” from the University of Alabama in collaboration with Shelton State Community College, received the top award, the Joe Kosmo Award for Excellence, at NASA’s Fifth Annual Robotic Mining Competition awards ceremony.

The mining competition, coordinated by Kennedy Space Center’s Education Office, was held May 19-23 at the Kennedy Visitor Complex.

The weeklong competition featured teams of undergraduate and graduate students from 36 colleges and universities across the United States.

For more information, visit: http://go.nasa.gov/1sBJiZn

Photo credit: Kim Shiflett

Ground support technicians use a special work stand to guide a roller bearing shaft for insertion on the C truck of crawler-transporter 2, or CT-2, inside the Vehicle Assembly Building at Kennedy Space Center on April 17.

The modifications are designed to ensure CT-2's ability to transport launch vehicles currently in development, such as the agency's Space Launch System, to the launch pad. The Ground Systems Development and Operations Program office at Kennedy is overseeing the upgrades.

For more information, visit:
http://www.nasa.gov/exploration/systems/ground/crawler-transporter.

Photo credit: NASA/Dimitri Gerondidakis

NASA and Lockheed Martin technicians and engineers conduct a center of gravity (CG) test on the Orion crew module June 8 inside the Operations and Checkout Building high bay at Kennedy Space Center.

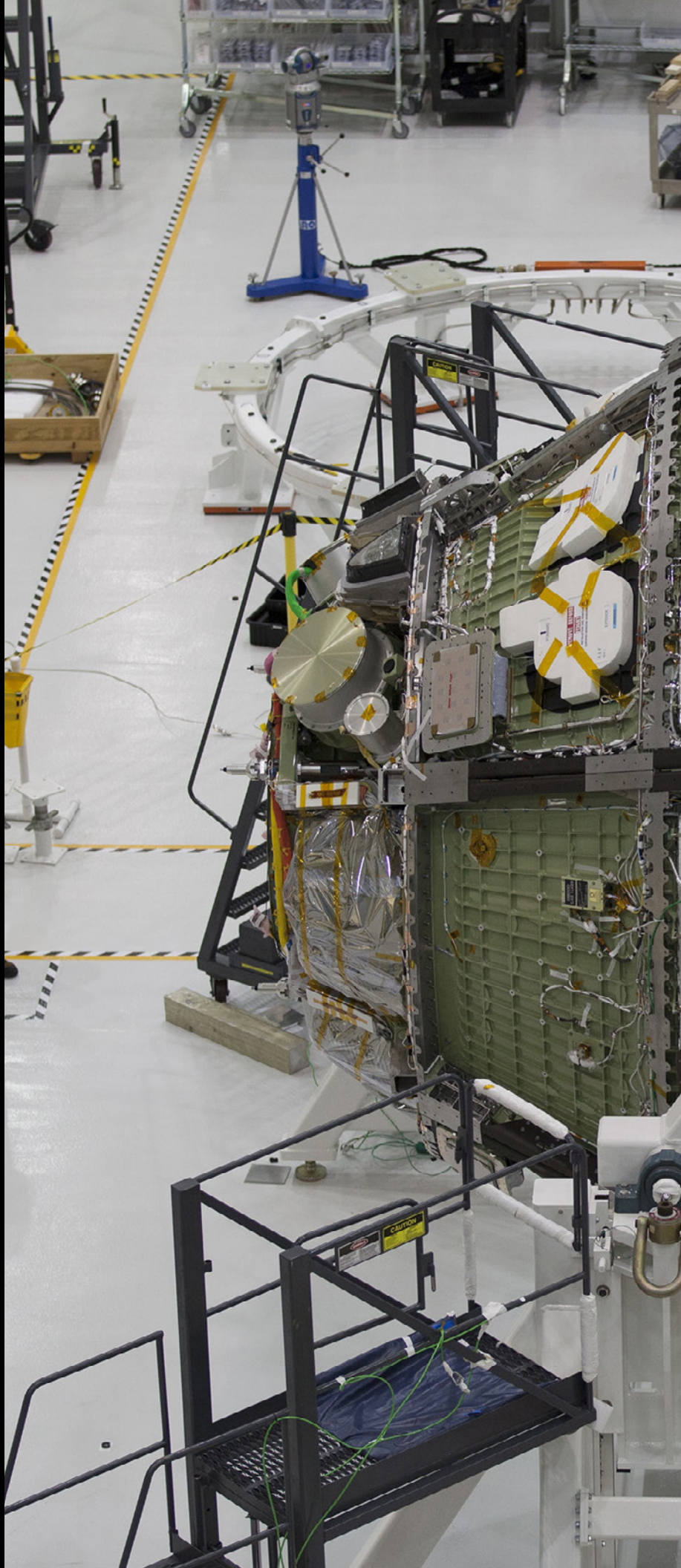
The CG tool measured the exact location of the vehicle's center of gravity.

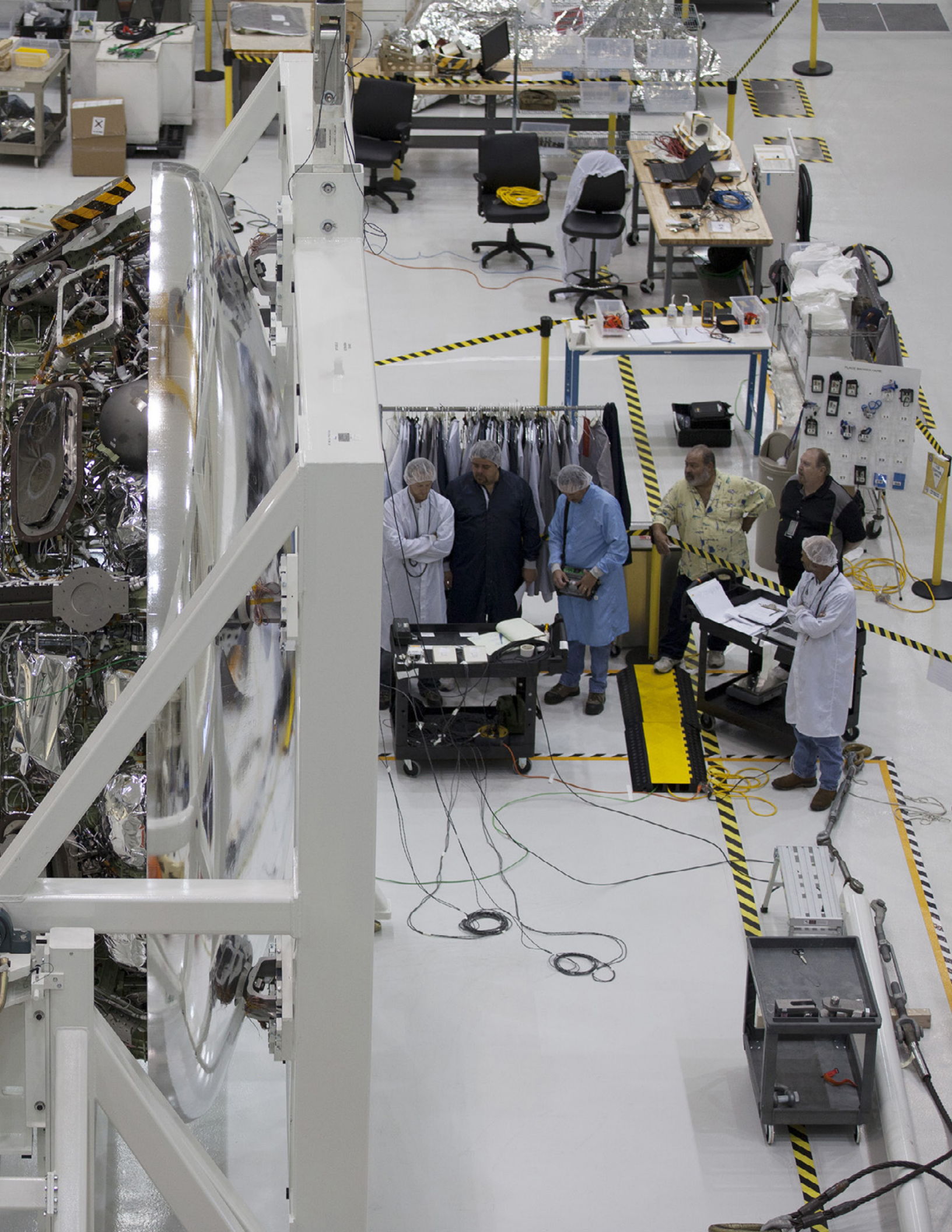
This test is important as it affects the handling and control characteristics of the vehicle.

The first unpiloted test flight of Orion, EFT-1, launched atop a Delta IV rocket and returned to Earth on Dec. 5.

For more information, visit: http://www.nasa.gov/orion

Photo credit: NASA/Glenn Benson





Kennedy Space Center has created a master plan describing how to transform it from a single-user federal entity to a 21st century spaceport supporting a multitude of users and operations.

This effort includes a central campus consolidation with a new headquarters building as one of the major components of its strategy.

There currently are about 700 facilities on the space center's 144,000 acres.

For more information, go to http://go.nasa.gov/1Am3Ypd

Image credit: NASA

Wildfires are in the news almost every day. Firefighters respond with teams on the ground and in the air.

The most up-to-date tools include helicopters and aircraft that drop large quantities of water and flame retardants.

This technology also is available at Kennedy Space Center.

Aircraft Operations teams train to perfect the skills needed to ensure they are ready to use these tools in the event of an out-of-control blaze at the spaceport.

For more information, go to http://go.nasa.gov/1EfV79g

Photo by NASA/Frankie Martin

This close-up view shows the United Launch Alliance Delta IV Heavy rocket for Exploration Flight Test-1 being raised into the vertical position at the pad at Space Launch Complex 37 at Cape Canaveral Air Force Station in Florida on Oct. 1.

The Delta IV Heavy was readied and launched Orion on its first flight test Dec. 5.

For more information, go to http://www.nasa.gov/orion/

Photo credit: NASA/Daniel Casper

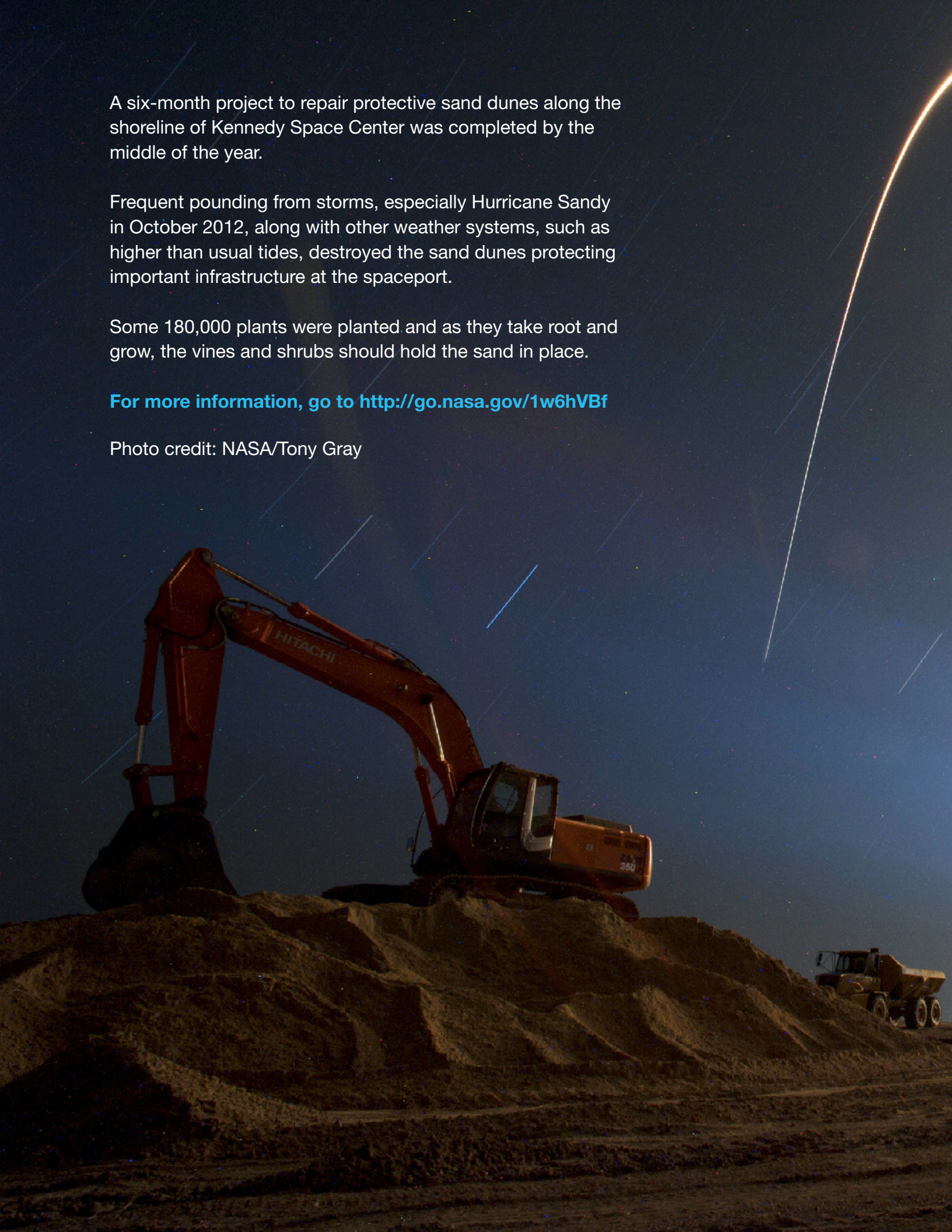
A six-month project to repair protective sand dunes along the shoreline of Kennedy Space Center was completed by the middle of the year.

Frequent pounding from storms, especially Hurricane Sandy in October 2012, along with other weather systems, such as higher than usual tides, destroyed the sand dunes protecting important infrastructure at the spaceport.

Some 180,000 plants were planted and as they take root and grow, the vines and shrubs should hold the sand in place.

For more information, go to http://go.nasa.gov/1w6hVBf

Photo credit: NASA/Tony Gray



History was made in the 525-foot-tall Vehicle Assembly Building (VAB) at Kennedy Space Center. It was inside the VAB that NASA's Apollo/Saturn V rockets and space shuttles were prepared for their rollout to launch pads 39A and B to begin their missions.

Today, the Ground Systems Development and Operations Program and support contractors at Kennedy are busy upgrading the massive building for the next chapter in human exploration.

For more information, go to http://go.nasa.gov/13lyzpN

Photo credit: NASA/ Dimitri Gerondidakis

An adult osprey returns home carrying a fish in its talons to its nest atop a speaker platform in the Press Site parking lot June 4 at Kennedy Space Center. In the background is a 12,300-square-foot NASA logo painted on the side of the 525-foot-tall Vehicle Assembly Building.

Merritt Island National Wildlife Refuge was established in 1963 as an overlay of Kennedy. Consisting of 140,000 acres, the refuge provides habitats for more than 1,500 species of plants and animals.

For information on the refuge, visit http://go.nasa.gov/1uWDpkK

Photo credit: NASA/Daniel Casper

During a helicopter survey of wildlife at Kennedy Space Center, an alligator is seen sharing a shallow marsh with a school of drum fish.

Since the earliest days of America's space program, telemetry has been used to track rockets and spacecraft. Similar technology now is being put to work by marine biologists to aid in studying activities of over a dozen managed fish and sea turtle species in the waters surrounding Kennedy Space Center.

For more information, visit: http://go.nasa.gov/136wrT5

Photo credit: InoMedic Health Applications/Russ Lower

NASA

NASA

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NASA's Exposing Microorganisms in the Stratosphere (E-MIST) experiment launched to the Earth's stratosphere on the exterior of a giant scientific balloon gondola at about 8 a.m. MST on Aug. 24 from Ft. Sumner, New Mexico.

Soaring 125,000 feet above the Earth, E-MIST was exposed to the upper atmosphere during a five-hour journey over the desert, to understand how spore-forming bacteria, commonly found in spacecraft assembly facilities, can survive.

For more information, go to http://go.nasa.gov/1vcwiWH

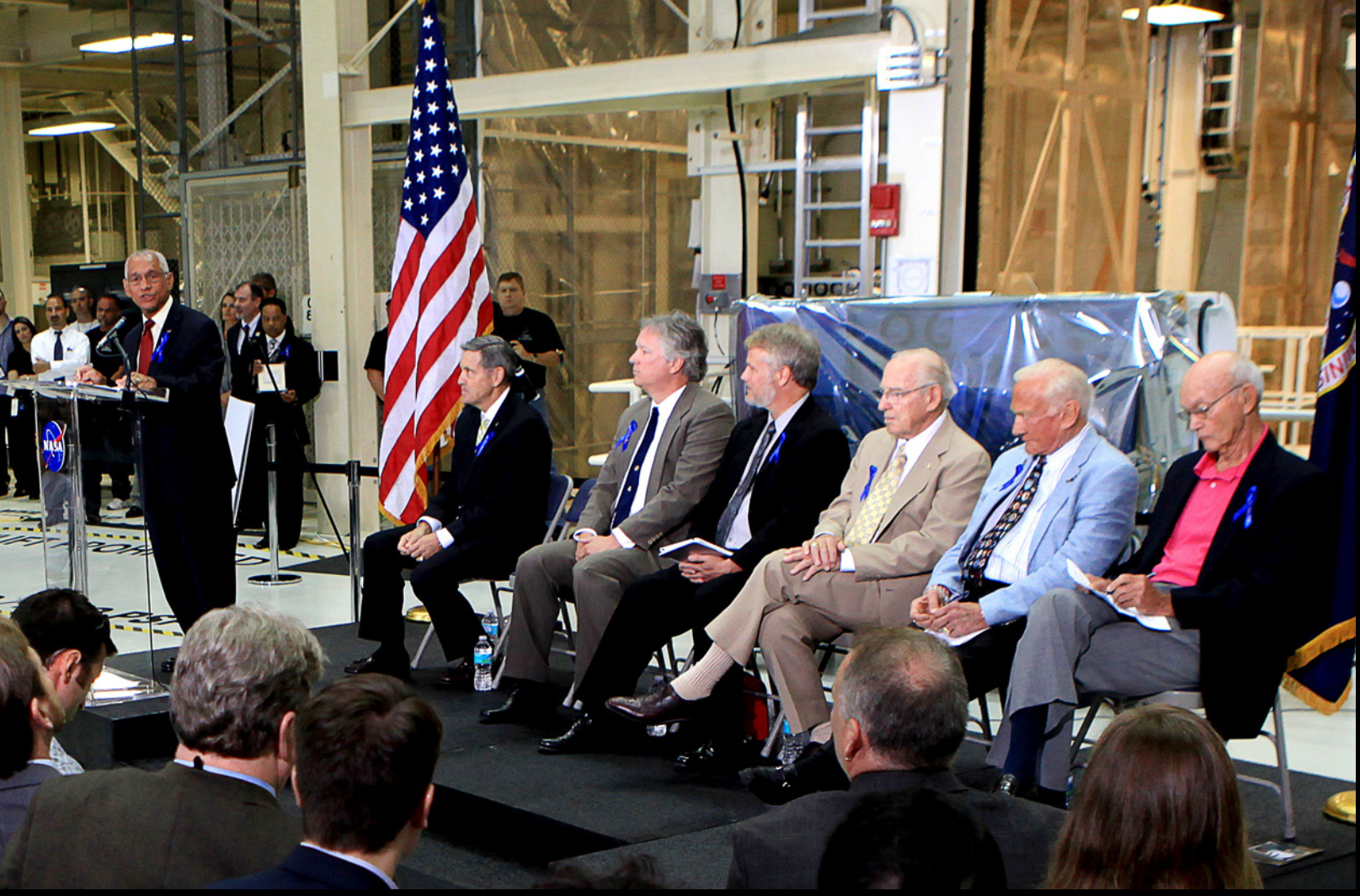
Photo credit: NASA/GoPro

Coupled Florida East Coast Railway, or FEC, locomotives No. 433 and No. 428, shown, pass the Vehicle Assembly Building in Launch Complex 39 at Kennedy Space Center on their way to NASA's Locomotive Maintenance Facility.

A Rail Vibration Test for the Canaveral Port Authority was conducted to collect amplitude, frequency and vibration test data utilizing two Florida East Coast locomotives operating on KSC tracks to ensure that future railroad operations will not affect launch vehicle processing at the center.

For more about the NASA Railroad, go to http://go.nasa.gov/1Am3Iqd

Photo credit: NASA/Daniel Casper



When visitors come to Kennedy Space Center, facilities such as the Vehicle Assembly Building and launch pads leave lasting impressions. A facility that has had a long-standing impact on America's human spaceflight programs recently was renamed in honor of Neil Armstrong.

Originally constructed as the Manned Spacecraft Operations Building, the facility was renamed the Operations and Checkout Building before the start of the Space Shuttle Program. It was dedicated as the Neil Armstrong Operations and Checkout Building in ceremonies July 21.

For more information, visit: http://go.nasa.gov/1ADzFly

Photo credit: TBD

An eruption of fire and smoke sent a SpaceX Dragon spacecraft skyward laden with 5,000 pounds of scientific equipment and supplies destined for use by the crew of the International Space Station.

Lifting off at on Sept. 21 from Launch Complex 40 at Cape Canaveral Air Force Station, Florida, the SpaceX Falcon 9 rocket and Dragon etched a yellow and white arc across the sky as it flew on a path roughly paralleling the East Coast of America.

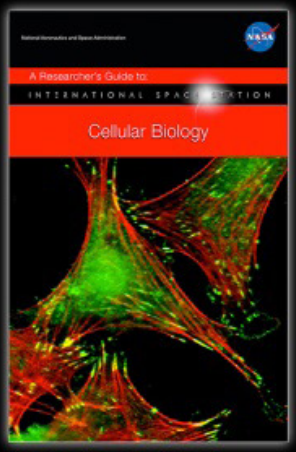
For more information, go to http://go.nasa.gov/1Am3uzl

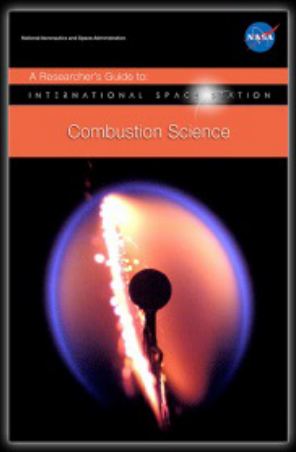
Photo by NASA/Jim Grossmann

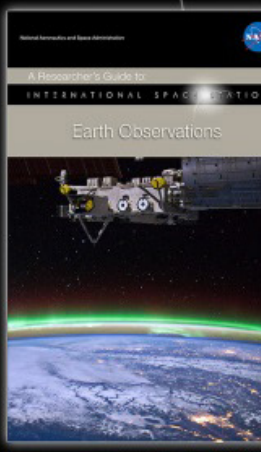
National Aeronautics and Space Administration

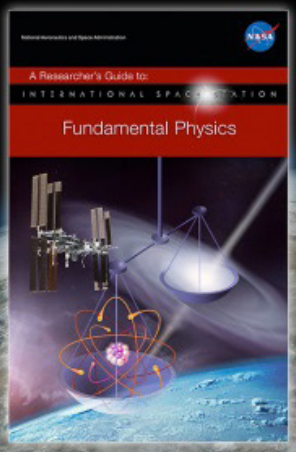
INTERNATIONAL SPACE

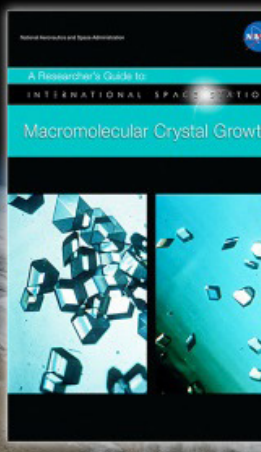
Researcher's Guide Series

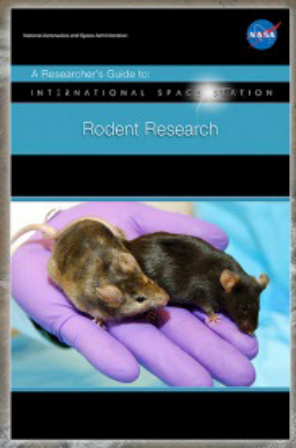


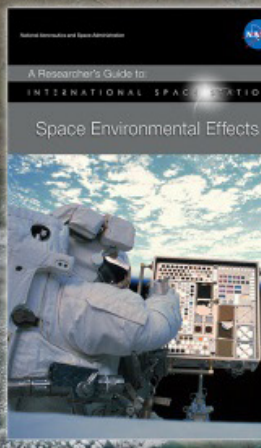


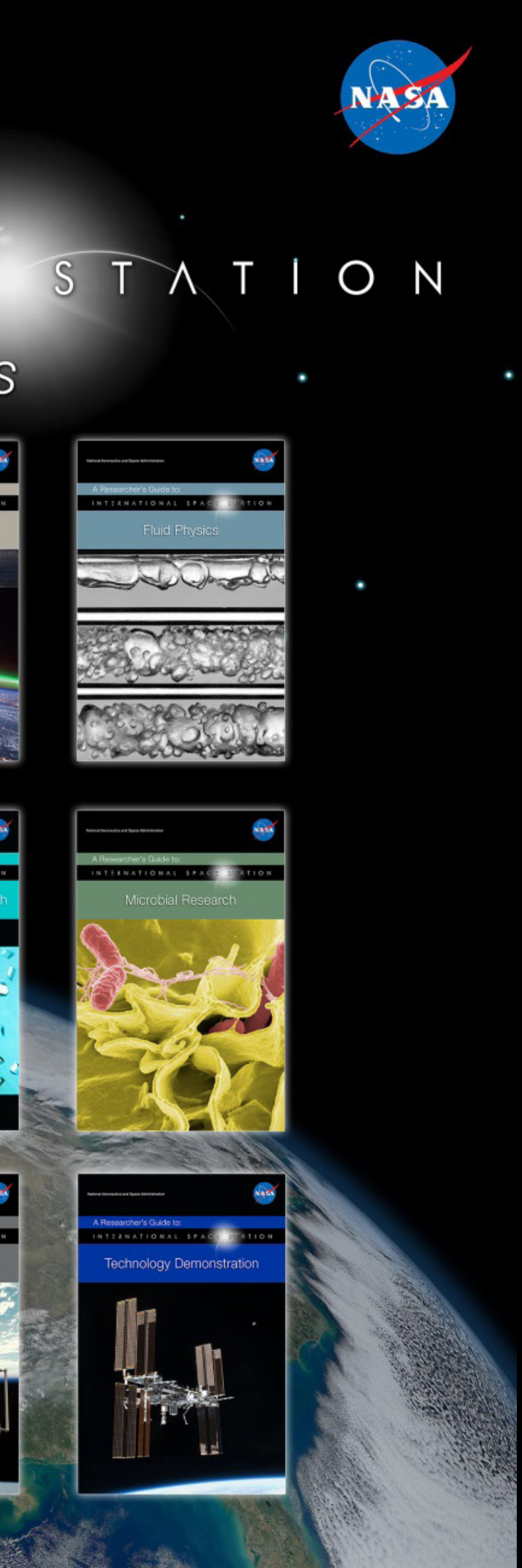












How many times do we see an innovation and think, “Of course! Why didn’t I think of that?” Our minds start turning towards thoughts of our own invention, sparking ideas and building possibilities.

This type of inspiration is the concept behind the International Space Station Program Science Office’s new 15-book Researcher’s Guide Series.

When scientists see what their colleagues have going on in orbit, their mental wheels may begin to speed up!

You can read the full story at: http://go.nasa.gov/1nyCRl3

National Aeronautics and Space Administration

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